



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,431	02/26/2004	Shi-Wai S. Cheng	GP-300576	4757
60770 7590 09/15/2010 General Motors Corporation c/o REISING ETHINGTON P.C. P.O. BOX 4390 TROY, MI 48099-4390				
EXAMINER WARTALOWICZ, PAUL A				
ART UNIT 1793		PAPER NUMBER		
MAIL DATE 09/15/2010		DELIVERY MODE PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/787,431

**Applicant(s)**

CHENG, SHI-WAI S.

**Examiner**

PAUL A. WARTALOWICZ

**Art Unit**

1793

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 August 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 22-24, 26-32 and 34-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22-24, 26-32 and 34-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments with respect to claims 22-24,26-32 and 34-46 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Objections***

Claim 28 is objected to because of the following informalities: claim 28 depends from cancelled claim 25. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 22-24, 26-32, 34, 35, 38, 40, 41, 43, 45, 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paas (US 5431706) in view of Rummler et al. (U.S. 5853579) and Dillman (US 5873918).

Paas teaches a first filter which has lateral sides and a rear side (fig. 1, #12, 20, 28) surrounded by a second filter on the lateral edges (fig. 1, #16, col. 3, 4).

Paas fails to teach a first space located between a side edge and the rear face of the catalyzed foam filter and an inner surface of the wall flow filter, wherein a second space is located between an outer surface of the wall flow filter and an inner surface of an exhaust conduit which circumferentially surrounds the wall flow filter, wherein exhaust flows in a radial and axial direction through the catalyzed foam filter, the first space, the wall flow filter, then a second space.

Dillman, however, teaches an apparatus for filtering diesel engine exhaust (col. 1, lines 10-20) wherein a first filter is disposed in an inner annulus (fig. 1, #10, col. 3, lines 35-60), surrounded by a first space on a side edge (col. 3, lines 15-35, fig. 1, #4), a permeable envelope pipe (col. 3, lines 15-35, fig. 1, #13) circumferentially surrounding the first filter (fig. 3, #4, 10, 13, col. 4, lines 45-60), and a second space between the permeable envelope pipe and the inner housing wall (fig. 1, #7, 13, col. 3, lines 35-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a first space, wall filter, and second circumferentially surrounding a side edge of the first filter of Paas in order to provide a known configuration for diesel exhaust treatment apparatus.

Additionally, Dillman teaches that the exhaust gases flow through the diesel exhaust trap axially/radially from the first filter through the first space, through the permeable pipe, and to the second space (col. 3, lines 25-35).

Regarding claims 22, 30, 40, and 43; it appears that the first space between the side edge of the first filter and the second filter is sufficient to trap particulate matter in the first space absent a showing to the contrary.

Paas fails to teach that the first filter is a catalyzed foam filter.

Rummler teaches a filter system (col. 1) wherein a first filter is a catalyzed ceramic foam filter for the purpose of treating and purifying exhaust gases (col. 31).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a catalyzed ceramic foam filter (col. 31) as the first filter of Paas in order to treat and purify exhaust gases as taught by Rummler.

Regarding claims 23 and 31, Paas teaches an exhaust conduit having a cavity defined by an inner surface in which the combination is received (fig. 1).

Regarding claim 24, 32, 41, and 43; Dillman teaches a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) so that the exhaust gas flows through the front face of the first filter and then the second filter.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) in Paas in order to flow the exhaust gas through the front face of the first filter and then the second filter as taught by Dillman.

Regarding claim 26, 29, and 34, Paas fails to teach that the second filter surrounds and is spaced a distance away from the first filter.

Rummler, however, teaches a filter system (col. 1) in which the fine wall filter surrounds a portion of a catalyzed foam filter in that the coarse foam filter is upstream and the fine filter is downstream such that the fine filter surrounds the rear portion of the catalyzed foam filter.

Therefore, it would have been obvious to provide the second filter downstream of the first filter such that the second filter of Paas surrounds the rear portion of the first filter because such a configuration is known as taught by Rummler.

Regarding claim 27, Paas teaches that the second filter (fig. 1, #16) is a permeable outer filter support (col. 3-4). This teaching appears to meet the limitation of a single cell wall flow filter in the absence of a showing to the contrary.

Regarding claims 27 and 28, it appears that the permeable envelope pipe of Dillman is porous wall spaced from the side edge of the first filter and is a single cell filter (col. 3, lines 15-35, fig. 1, #13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide perforated walls as the fine filter in Rummler because the perforated walls would be able to filter solids in the absence of a showing to the contrary.

Regarding claims 30 and 43, Paas teaches a plurality of filter combinations (fig. 1).

Regarding claims 35 and 38, it appears that the combined prior art of Paas, Rummler, and Dillman teach an apparatus able to flow engine exhaust gas through the catalyzed foam filter and the wall flow filter.

Claims 22-24, 26-29, 35, 40, 41, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rummler et al. (U.S. 5853579) in view of Dillman (US 5873918).

Rummler teach a filter system (col. 1) comprising passing exhaust through to coarse foam filter which can be catalyzed (instant ceramic foam filter, col. 31, fig. 24A) and then through a fine filter (instant wall flow filter, col. 31, fig. 24A).

Rummler fails to teach a first space located between a side edge and the rear face of the catalyzed foam filter and an inner surface of the wall flow filter, wherein a second space is located between an outer surface of the wall flow filter and an inner surface of an exhaust conduit which circumferentially surrounds the wall flow filter, wherein exhaust flows in a radial and axial direction through the catalyzed foam filter, the first space, the wall flow filter, then a second space.

Dillman, however, teaches an apparatus for filtering diesel engine exhaust (col. 1, lines 10-20) wherein a first filter is disposed in an inner annulus (fig. 1, #10, col. 3, lines 35-60), surrounded by a first space on a side edge (col. 3, lines 15-35, fig. 1, #4), a permeable envelope pipe (col. 3, lines 15-35, fig. 1, #13) circumferentially surrounding the first filter (fig. 3, #4, 10, 13, col. 4, lines 45-60), and a second space between the permeable envelope pipe and the inner housing wall (fig. 1, #7, 13, col. 3, lines 35-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a first space, wall filter, and second circumferentially surrounding a side edge of the catalyzed foam filter of Rummler in order to provide a known configuration for diesel exhaust treatment apparatus.

Additionally, Dillman teaches that the exhaust gases flow through the diesel exhaust trap axially/radially from the first filter through the first space, through the permeable pipe, and to the second space (col. 3, lines 25-35).

Regarding claims 22, 40; it appears that the first space between the side edge of the first filter and the second filter is sufficient to trap particulate matter in the first space absent a showing to the contrary.

It appears that Rummler teaches the limitations of claim 23 as the exhaust stream is passed to a foam filter, such that the gas has to be passed through a canal (conduit) having an inner surface and a cavity.

Regarding claims 24, 41; Dillman teaches a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) so that the exhaust gas flows through the front face of the first filter and then the second filter.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) in Rummler in order to flow the exhaust gas through the front face of the first filter and then the second filter as taught by Dillman.

Regarding claim 26, it appears the teaching in Rummler teaches the limitation of the fine wall filter surrounding a portion of a catalyzed foam filter in that the coarse foam filter is upstream and the fine filter is downstream such that the fine filter surrounds the rear portion of the catalyzed foam filter.



Regarding claims 26, 29, it appears that the teaching in Rummler meet the limitation wherein the porous wall is spaced a distance from, and surrounds, the rear face of the catalyzed foam filter in that the fine filter is located downstream from the catalyzed foam filter.

Regarding claims 27 and 28, it appears that the permeable envelope pipe of Dillman is porous wall spaced from the side edge of the first filter and is a single cell filter (col. 3, lines 15-35, fig. 1, #13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide perforated walls as the fine filter in Rummler because the perforated walls would be able to filter solids in the absence of a showing to the contrary.

Regarding claim 35, it appears that the combined prior art of Rummler and Dillman teach an apparatus able to flow engine exhaust gas through the catalyzed foam filter and the wall flow filter.

Claims 30-32, 34, 38, 43, 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rummler et al. (U.S. 5853579) in view of Dillman (US 5873918) and either one of Miller et al. (3319793), Nagaoka (6488842) or Paas (US 5431706).

Rummler teach a filter system (col. 1) comprising passing exhaust through to coarse foam filter which can be catalyzed (instant ceramic foam filter, col. 31, fig. 24A) and then through a fine filter (instant wall flow filter, col. 31, fig. 24A).

Rummler fails to teach a first space located between a side edge and the rear face of the catalyzed foam filter and an inner surface of the wall flow filter, wherein a second space is located between an outer surface of the wall flow filter and an inner surface of an exhaust conduit which circumferentially surrounds the wall flow filter, wherein exhaust flows in a radial and axial direction through the catalyzed foam filter, the first space, the wall flow filter, then a second space.

Dillman, however, teaches an apparatus for filtering diesel engine exhaust (col. 1, lines 10-20) wherein a first filter is disposed in an inner annulus (fig. 1, #10, col. 3, lines 35-60), surrounded by a first space on a side edge (col. 3, lines 15-35, fig. 1, #4), a permeable envelope pipe (col. 3, lines 15-35, fig. 1, #13) circumferentially surrounding the first filter (fig. 3, #4, 10, 13, col. 4, lines 45-60), and a second space between the permeable envelope pipe and the inner housing wall (fig. 1, #7, 13, col. 3, lines 35-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a first space, wall filter, and second circumferentially surrounding a side edge of the catalyzed foam filter of Rummler in order to provide a known configuration for diesel exhaust treatment apparatus.

Additionally, Dillman teaches that the exhaust gases flow through the diesel exhaust trap axially/radially from the first filter through the first space, through the permeable pipe, and to the second space (col. 3, lines 25-35).

Rummler fail to teach a plurality of filter combinations.

Miller teaches a filter system (col. 1) wherein it is known to provide multiple filters in a housing in the filtering art (col. 1-2).

Nagaoka teach a filter system (col. 1) wherein multiple filters are disposed in a housing (fig. 1, # 2, 7).

Paas teaches a filter system (col. 1) wherein multiple filters are disposed in a housing for the purpose of providing multiple flow paths for exhaust gases (fig. 1, #36, 38, 40).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide multiple filters disposed in the housing in Rummler because it is well known in the art to provide multiple filters for multiple effect and efficiency as taught by Miller, Nagaoka, or Paas.

Regarding claims 30 and 43; it appears that the first space between the side edge of the first filter and the second filter is sufficient to trap particulate matter in the first space absent a showing to the contrary.

It appears that Rummler teach the limitations of claim 31 as the exhaust stream is passed to a foam filter, such that the gas has to be passed through a canal (conduit) having an inner surface and a cavity.

Regarding claims 32 and 43, Dillman teaches a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) so that the exhaust gas flows through the front face of the first filter and then the second filter.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) in Rummler in order to flow

the exhaust gas through the front face of the first filter and then the second filter as taught by Dillman.

Regarding claim 34, it appears that the teaching in Rummler meet the limitation wherein the porous wall is spaced a distance from, and surrounds, the rear face of the catalyzed foam filter in that the fine filter is located downstream from the catalyzed foam filter.

Regarding claim 38, it appears that the combined prior art of Rummler and Dillman teach an apparatus able to flow engine exhaust gas through the catalyzed foam filter and the wall flow filter.

Claims 36, 37, 39, 42, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paas (US 5431706) in view of Rummler et al. (U.S. 5853579) and Dillman (US 5873918) and Ernst (US 3290876).

Rummler teaches an apparatus as described above in claims 22 and 40.

Rummler fails to teach an exhaust line connected to the engine, the exhaust line connected to the conduit.

Ernst, however, teaches an engine upstream (col. 1) connected to an exhaust line (fig. 1, #3, col. 1, 2) that is connected to a housing (fig. 1, #1, col. 1, 2) wherein a separator has an opening through the separator for the purpose of flowing exhaust gasses through channels and then through filters (col. 1, 2, 3, fig. 1, #9, 11, 12).

As Ernst teaches an engine upstream (col. 1) connected to an exhaust line (fig. 1, #3, col. 1, 2) that is connected to a housing (fig. 1, #1, col. 1,2) wherein the a

separator has an opening through the separator for the purpose of flowing exhaust gasses through channels and through filters (col. 1,2,3, fig. 1, #9,11,12), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a separator has an opening through the separator for the purpose of flowing exhaust gasses through the coarse filter and wall filter of Rummler.

Regarding claim 37, Dillman teaches a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) so that the exhaust gas flows through the front face of the first filter and then the second filter.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) in Paas in order to flow the exhaust gas through the front face of the first filter and then the second filter as taught by Dillman.

Claims 36, 37, 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rummler et al. (U.S. 5853579) in view of Dillman (US 5873918) and Ernst (US 3290876).

Rummler teaches an apparatus as described above in claims 22 and 40.

Rummler fails to teach an exhaust line connected to the engine, the exhaust line connected to the conduit.

Ernst, however, teaches an engine upstream (col. 1) connected to an exhaust line (fig. 1, #3, col. 1, 2) that is connected to a housing (fig. 1, #1, col. 1, 2) wherein a

separator has an opening through the separator for the purpose of flowing exhaust gasses through channels and then through filters (col. 1, 2, 3, fig. 1, #9, 11, 12).

As Ernst teaches an engine upstream (col. 1) connected to an exhaust line (fig. 1, #3, col. 1, 2) that is connected to a housing (fig. 1, #1, col. 1,2) wherein the a separator has an opening through the separator for the purpose of flowing exhaust gasses through channels and through filters (col. 1,2,3, fig. 1, #9,11,12), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a separator has an opening through the separator for the purpose of flowing exhaust gasses through the coarse filter and wall filter of Rummler.

Regarding claim 37, Dillman teaches a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) so that the exhaust gas flows through the front face of the first filter and then the second filter.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a connecting flange (separator) that is connected to the inner surface of the housing (fig. 1, #7, 22) in Paas in order to flow the exhaust gas through the front face of the first filter and then the second filter as taught by Dillman.

Claims 39 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rummler et al. (U.S. 5853579) in view of Dillman (US 5873918) and Ernst (US 3290876) and either one of Miller et al. (3319793), Nagaoka (6488842) or Paas (US 5431706).

Rummler teaches an apparatus as described above in claims 30 and 43.

Rummler fails to teach an exhaust line connected to the engine, the exhaust line connected to the conduit.

Ernst, however, teaches an engine upstream (col. 1) connected to an exhaust line (fig. 1, #3, col. 1, 2) that is connected to a housing (fig. 1, #1, col. 1, 2) wherein a separator has an opening through the separator for the purpose of flowing exhaust gasses through channels and then through filters (col. 1, 2, 3, fig. 1, #9, 11, 12).

As Ernst teaches an engine upstream (col. 1) connected to an exhaust line (fig. 1, #3, col. 1, 2) that is connected to a housing (fig. 1, #1, col. 1, 2) wherein the a separator has an opening through the separator for the purpose of flowing exhaust gasses through channels and through filters (col. 1,2,3, fig. 1, #9,11,12), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a separator has an opening through the separator for the purpose of flowing exhaust gasses through the coarse filter and wall filter of Rummler.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz  
September 3, 2010

/Stanley Silverman/  
Supervisory Patent Examiner, AU 1793